

# **HOMOGENEOUS CHARGE COMPRESSION IGNITION CONTROL UTILIZING PLASMATRON FUEL CONVERTER TECHNOLOGY**

## **Abstract of the Disclosure**

5           A method and apparatus for operation of an internal combustion engine running under  
a homogeneous charge compression ignition (HCCI) mode with fuel partially reformed by an  
onboard fuel reformer. In one embodiment, the onboard fuel reformer is a plasmatron fuel  
converter. The temperature and composition of the gaseous charge into the cylinders of the  
engine can be adjusted by mixing the charge into the cylinder (which contains air, exhaust  
10 gas and/or unreformed fuel) with hydrogen rich gas from the onboard reformer. The fuel  
reformer transforms the fuel to a mixture of hydrogen, CO and other light hydrocarbons. By  
adjusting operation in the reformer, the composition of the reformat can be altered. In  
addition to thermal management of the cylinder charge, the reformat can be used as a fuel  
blending agent in order to adjust the octane/cetane number of the air charge and thus control  
15 the ignition timing of the overall fuel/air charge to the cylinder.